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PLAQUE ASSESSMENT WITH A NOVEL HIGH-DEFINITION 60-MHZ IVUS IMAGING SYSTEM: COMPARISON WITH CONVENTIONAL 40 MHZ IVUS AND OPTICAL COHERENCE TOMOGRAPHY

Oral Contributions
West, Room 2004
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Background: Despite its superior image resolution to IVUS, optical coherence tomography (OCT) is limited in comprehensive vessel analysis due to limited signal penetration. We sought to evaluate the feasibility of novel 60MHz IVUS imaging in qualitative and quantitative assessment of coronary lesions compared with conventional 40MHz IVUS and OCT.

Methods: We assessed lesion characteristics in 9 autopsied coronary artery specimens in saline by OCT, 60MHz IVUS (Silicon Valley Medical Instruments, Inc) and commercial 40MHz IVUS.

Results: A total of 50 matched cross-sections were independently analyzed with the 3 modalities. Numbers of detectable coronary dissection were 32, 16, and 6 for OCT, 60MHz IVUS and 40MHz IVUS, respectively (p=0.029). Among the OCT-detected dissections, 18 showed a layered intraluminal flap (thickness range: 30-440 μm). All flaps ≥80 μm were detected by 60MHz IVUS, while 40MHz IVUS found flaps only ≥220 μm. A lipid core was identified by OCT in 18 cross-sections: all of them were also detected by 60MHz IVUS, whereas 40MHz IVUS failed to detect 8 lipid cores. Area measurements of lipid core (0.93±0.76 mm2) and vessel (EEM: 15.1±3.0 mm2, remodeling index 1.11±0.04) were possible only by 60MHz IVUS. In addition, 60MHz IVUS suggested 2 extra lesions with deep lipid core that were undetectable by OCT.

Conclusion: The novel 60MHz IVUS is superior to conventional 40MHz IVUS in microscopic plaque evaluation, while embracing the advantage of IVUS in entire vessel wall assessment over OCT.